What is Claimed is:

- 1. An apparatus for de-interleaving the interleaved data in a coded orthogonal frequency
- 2 division multiplexing receiver, comprising:
- 3 a de-interleaving memory for de-interleaving said interleaved data; and
- a controller for generating the correct access addresses of said de-interleaving
- 5 memory for the data to be de-interleaved, and controlling the read and write
- 6 operations to said de-interleaving memory.
- 1 2. The apparatus for de-interleaving the interleaved data in a coded orthogonal
- 2 frequency division multiplexing receiver as claimed in claim 1, wherein said
- 3 controller further comprises an address generator having a plurality of base address
- 4 generators and a read/write control circuitry.
- 1 3. The apparatus for de-interleaving the interleaved data in a coded orthogonal
- 2 frequency division multiplexing receiver as claimed in claim 2, wherein said base
- address generators further include a segment base address generator, a group base
- 4 address generator, a sub-group base address generator, and a cell base address
- 5 generator.
- 1 4. The apparatus for de-interleaving the interleaved data in a coded orthogonal
- 2 frequency division multiplexing receiver as claimed in claim 3, wherein each said
- 3 base address generator includes a pointer that indicates the starting address of the
- 4 corresponding segment, group, or sub-group, or the address of the corresponding cell.
- 1 5. The apparatus for de-interleaving the interleaved data in a coded orthogonal
- 2 frequency division multiplexing receiver as claimed in claim 2, wherein said address

- 3 generator is implemented by two multiplexers, two multipliers, a divider, a quotient
- 4 unit, a remainder unit, a look up table, a counter, and two adders.
- 1 6. A method for de-interleaving the interleaved data in a coded orthogonal frequency
- 2 division multiplexing receiver, said de-interleaving including frequency de-
- 3 interleaving, block de-interleaving and time de-interleaving, said method comprising
- 4 the steps of:
- 5 (a) generating access addresses of a de-interleaving memory and controlling the read
- and write operations for said interleaved data; and
- 7 (b) de-interleaving said interleaved data in a manner of simultaneously performing
- 8 said frequency de-interleaving, said block de-interleaving and said time de-
- 9 interleaving in said de-interleaving memory.
- 1 7. The method for de-interleaving the interleaved data in a coded orthogonal frequency
- division multiplexing receiver as claimed in claim 6, wherein said generating access
- addresses in said step (a) further comprises the steps of:
- 4 (a1) generating a plurality of base addresses including a segment base address, a
- 5 group base address, a sub-group base address and a cell address; and
- 6 (a2) calculating said access address according to said plurality of base addresses.
- 1 8. The method for de-interleaving the interleaved data in a coded orthogonal frequency
- 2 division multiplexing receiver as claimed in claim 7, wherein said segment base
- address in said step (a1) is a pointer that indicates the starting address of a segment,
- 4 and a segment is defined as the required memory capacity in said de-interleaving
- 5 memory for de-interleaving an orthogonal frequency division multiplexing symbol.
- 1 9. The method for de-interleaving the interleaved data in a coded orthogonal frequency

- division multiplexing receiver as claimed in claim 7, wherein said group base address
- in said step (a1) is a pointer that indicates the starting address of a group in the
- 4 current segment, and a group is determined by the total delay units in a cycle to
- 5 perform said time de-interleaving for said interleaved data.
- 1 10. The method for de-interleaving the interleaved data in a coded orthogonal frequency
- division multiplexing receiver as claimed in claim 7, wherein said sub-group base
- address in said step (a1) is a pointer that indicates the starting address of a sub-group,
- 4 and a sub-group is defined as a row in said group.
- 1 11. The method for de-interleaving the interleaved data in a coded orthogonal frequency
- 2 division multiplexing receiver as claimed in claim 7, wherein said cell address in said
- 3 step (a1) is a pointer that indicates which cell in said sub-group that the interleaved
- 4 data is to be written into or read from.
- 1 12. The method for de-interleaving the interleaved data in a coded orthogonal frequency
- division multiplexing receiver as claimed in claim 10, wherein said sub-group base
- address is determined by referring to a look up table that points out the offset from the
- 4 starting address of said row to the starting address of said group.
- 1 13. A method for generating an access address of a de-interleaving memory used for a de-
- 2 interleaving process in a coded orthogonal frequency division multiplexing receiver,
- 3 comprising the steps of:
- 4 (a) generating a segment pointer that indicates the starting address of a segment in
- 5 said de-interleaving memory, wherein a segment is defined as the required
- 6 memory capacity for de-interleaving an orthogonal frequency division
- 7 multiplexing symbol;

8 (b) dividing said segment into a plurality of groups, and generating a group pointer
9 that indicates the starting address of a group in said segment, wherein a group is
10 determined by the total delay units in a cycle to perform said time de-interleaving
11 for said interleaved data;

12

13

14

15

16

17

- (c) generating a sub-group pointer by referring to a look up table, wherein a sub-group is defined as a row in said group and said sub-group pointer indicates the starting address of said sub-group;
- (d) generating a cell pointer that indicates which cell in said sub-group the interleaved data is to be written into or read from, wherein said cell pointer has an initial value and said initial value is pre-determined; and
- (e) calculating said access address by summing up said segment pointer, said group
 pointer, said sub-group pointer and said cell pointer.
- 1 14. The method for generating an access address of a de-interleaving memory used for a
 2 de-interleaving process in a coded orthogonal frequency division multiplexing
 3 receiver as claimed in claim 13, wherein said look up table points out the offset from
- 4 the starting address of said row to the starting address of said group.